

THE REFINING OF KRAFT SCREENINGS WITH THE ROD MILL

By
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Object of the Work

The experiments reported here were made with the object of determining the applicability of the rod mill to the refining of kraft screenings and its comparison with the ball-mill type of refiner. This work was done in cooperation with a large Wisconsin kraft mill. The test was made on July 23, 1926.

Materials

About 500 pounds of screenings were supplied by the cooperator. The material had been pressed and dried to a moisture content of approximately 17 per cent.

Description of the Apparatus

The rod mill consists of a rotating drum containing steel or bronze rods. The tumbling of these rods, by rotation of the drum, results in a grinding action similar to that of a ball-mill grinder. This equipment has been in use as an ore grinder in the mining industry for a number of years.

The inside dimensions of this rod mill are 3 feet in diameter by 5 feet long. The rods are 4 feet, 8 inches long, and vary from 1-1/2 to 2-1/2 inches in diameter. The mill is rubber lined and fitted with a screw feeding device to insure positive feed. Power is supplied by a 15-horsepower variable speed motor.

Procedure and Results

In this test the total rod charge (steel rods were used) was 3720 pounds. The rotating speed of the mill was 28 r.p.m.

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The screenings were passed through the mill at various rates, viz., 26.8, 17.8, and 8.9 pounds, oven-dry weight, per hour. The consistence in all cases was 6 per cent.

After passing through the rod mill the pulp was screened through a 20-cut diaphragm screen. The screenings from the entire run amounted to two large handfuls, or less than 0.5 per cent of the pulp screened.

The pulp produced at the rate of 26.8 pounds per hour contained many large shives, but was said to be a great improvement over the pulp produced by the ball-mill refiner in the cooperator's mill. The second part of the run contained fewer shives, and the third part, ground at a rate of 8.9 pounds per hour, contained still fewer and much smaller shives. Hand sheets made from wet machine samples of the three different grades are attached, and numbered I, II, and III, referring to passage of the quantities 26.8, 17.8, and 8.9 pounds of screenings, respectively, through the rod mill, as noted above.

Mullen pop tests made on the hand sheets from these runs gave the following results:

- I. 0.567 points per pound per ream (24x36-500)
- II. 0.782 points per pound per ream (24x36-500)
- III. 0.753 points per pound per ream (24x36-500)

The power consumption during the first part of the run was 31.4 horsepower per ton; for the second part, 47.4 horsepower per ton; and for the third part, 94.6 horsepower per ton. Commercial installations of mills 6 feet in diameter by 12 feet length, however, have shown power consumption of approximately one-third that of the mill at the Forest Products Laboratory.



Plate 1

M19245F



Plate 2

Kraft Screenings Sheets



Plate 3